

### DETAILED DESCRIPTION OF THE INVENTION

Referring now to FIG. 1, there is shown a block diagram of a cellular telecommunications network 10 implementing the inter-network message communications functionality of the present invention. Included in the cellular network 10 are a plurality of mobile stations 12 and base stations 14 that engage in radio-frequency communications with each other. The mobile stations 12 roam throughout a service area which is divided into a plurality of cells 16 wherein each cell is served by one of the plurality of included network base stations 14. The network 10 further includes a mobile switching center (MSC) 18 connected by a radio-frequency or hard wired communications link to each of the base stations 14 in the service area. The cellular network 10 is further connected via the mobile switching center 18 to a number of other non-cellular networks 20 including a conventional telephone network (like a PSTN) 20(1), a local area network (LAN) 20(2), and a wide area network (WAN) 20(3). For a LAN or WAN connection, the mobile switching center 18 preferably comprises either a node on the network or, alternatively, accesses a network node via the telephone network 20(1) as illustrated by the broken line extending between the telephone network and WAN 20(3).

The mobile switching center 18 includes a message center (MC) 22, a home location register (HLR) 24 and a visitor location register (VLR) 26. It will, of course, be understood that the message center, home location register and visitor location register may be alternatively implemented in stand-alone fashion if desired. The message center 22 receives, stores and forwards short message service (SMS) messages, and perhaps other message types, addressed for delivery to and received from the mobile stations 12. The home location register 24 stores permanent data for each subscriber that is independent of the current location of the subscriber. The home location register 24 may further store temporary data concerning the address in the message center 22 of any stored short message service messages, and an indication of a message waiting to be delivered to the mobile station. The visitor location register 26 stores current data for each subscriber including the current or most recently known location of the mobile station 12 for the subscriber, the on/off status of the mobile station, security parameters, and an indication of a message waiting to be delivered to the mobile station.

The message center 22 is of conventional design and operates as is known in the art, but further includes an inter-network communications functionality (ICF) 28 which facilitates the transmission of messages between the cellular network 10 and the other networks 20 connected thereto at the message center. Using the inter-network communications functionality 28, a mobile station 12 can initiate and send a message from the cellular network 10 for delivery in the proper format to a certain addressee/destination over one of the other non-cellular networks 20. Thus, the mobile station 12 can generate an SMS message that is carried over the cellular network 10, converted by the functionality 28 in the message center 22, and then delivered as a facsimile transmission over the conventional telephone network 20(1) or an e-mail transmission over the LAN/WAN 20(2/3). Conversely, the functionality 28 allows a third party to initiate and send a message from one of the other non-cellular networks 20 for delivery to a certain subscriber mobile station 12 (addressee) over the cellular network 10. In this operation, a user can generate an e-mail message that is carried over the LAN/WAN 20(2/3), converted by the

functionality 28 in the message center 22, and then delivered as an SMS message over the cellular network 10.

The functionality 28 thus operates to convert among and between any of the many different messaging formats supported by the networks 10 and 20 connected to the message center 22. With reference now to FIGS. 2A-2D, there are illustrated several message formats adapted and modified for transmitting inter-network messages in accordance with the present invention.

With specific reference to FIG. 2A, there is shown the format for an e-mail-to-SMS message transmission from either a LAN 20(2) or WAN 20(3) user to a subscriber on the cellular network 10. The format of FIG. 2A comprises three fields: a destination address field 32; a title field 34; and, a text field 36. The destination address field 32 is filled-in by the sender with the network address on the LAN 20(2) or WAN 20(3) for the message center 22 of the cellular network 10. The title field 34 is filled-in with sender selected information not important to the operation of the present invention comprising the title or subject of the e-mail message. The text field 36 includes the alphanumeric text 38 of the message being sent to the subscriber, and also a destination identifier 40 identifying for the functionality 28 of the message center 22 the ultimate destination (addressee) mobile station 12 on the cellular network 10 of the e-mail message.

In FIG. 2B there is shown the format for a facsimile-to-SMS message transmission from the conventional telephone network 20(1) to a subscriber on the cellular network 10. Like the e-mail format of FIG. 2A, the facsimile format of FIG. 2B includes a destination address field 32 and a text field 36. The destination address field 32 in this case is filled-in by the sender with the facsimile telephone number on the telephone network 20(1) for the message center 22 of the cellular network 10. The text field 36 includes the alphanumeric text 38 of the message being sent to the subscriber, and a destination identifier 40 identifying for the functionality 28 of the message center 22 the ultimate destination (addressee) mobile station 12 on cellular network 10 of the facsimile message. It will be understood that facsimile images transmissions (pictures, handwritten text, etc.) to mobile stations are not, at this time, possible. It is only recognizable text (e.g., typewritten) in a facsimile message that may be converted (perhaps through a scanning operation performed by or in association with the functionality 28) to an SMS text message for delivery to the mobile station.

Referring now to FIG. 2C, there is shown the format for an SMS-to-e-mail message transmission from a cellular subscriber on the cellular network 10 to either a LAN 20(2) or WAN 20(3) user. This format includes only a text field 36 comprising the alphanumeric text 38 of the message being sent from the mobile station 12 of the cellular subscriber, and a destination identifier 40 identifying for the functionality 28 of the message center 22 the ultimate destination (addressee) on the LAN 20(2) or WAN 20(3) of the e-mail message.

Similarly, with reference to FIG. 2D, the format of an SMS-to-facsimile message transmission from a cellular subscriber on the cellular network 10 to the conventional telephone network 20(1) includes only a text field 36 comprising the alphanumeric text 38 of the message being sent from the mobile station 12 of the cellular subscriber, and a destination identifier 40 identifying for the functionality 28 of the message center 22 the ultimate destination (addressee) on the conventional telephone network 20(1) of the facsimile message.